REMARKS

Claims 1-11 have been rejected over Amerman, et al., in view of Mogensen , alleging that it would be obvious to form the Amerman et al., pipes with integral web portions in view of Mogensen.

This rejection is respectfully traversed.

It is assumed that the Examiner intends to modify Amerman et al., pipes 40 of Figs. 5A, 5B and 5C, pipe 150/154 of Figs. 8A and 8B and pipe 200/202 of Fig. 11 because using a web between sections of pipe 40 in Figs. 5A, 5B and 5C would interfere with and prevent the use of grout pipe 41 in the Amerman device.

The teaching of spacers 6 of Mogensen are for the purpose of:

"...decreasing or increasing the spacing of said pipes from said central axis to decrease or increase an overall radial dimension of the heat exchanger so as to contact the heat exchanging pipes with a defining surface of the drill hole." (emphasis added) (Claim 6, column 4, lines 49-53). Similar language can be found in Mogensen in column 2, lines 63-69; column 3, lines 15-24; column 3, lines 40-46; column 4, lines 5-8; column 4, lines 24-29; and column 4, lines 32-41.

Independent claim 1 of the instant invention recites:

"...**said first and second pipes are spaced apart by a predetermined distance** and are integrally attached by an integral attachment to each other along the at least a portion length thereof."

Independent claim 7 of the instant invention recites:

"...a web integrally connected to each of the first and second pipes for holding the second pipe a **predetermined distance** from the first pipe; and

wherein at least a portion of each of the first pipe, the second pipe and the web are disposed underground **at said predetermined distance apart**." (Emphasis added.)

Of course whenever two references are combined, they have to be combined according to the actual teachings of the references. In this case the teaching of Mogensen is to **not keep the pipes at a predetermined distance apart.** So to apply the Mogensen teaching to Amerman would be to use the webs of Mogensen so that the pipes of Amerman would be spaced

apart farther than the diameter of the hole in the ground so that when you force the Amerman pipes into the hole the webs force the Amerman pipes 150/154 or 200/200 outwardly against the walls of the hole. Furthermore, the Mogensen teaches using the webs or spacers 6 on helical pipes, not parallel pipes. Using the Mogensen teaching of spacers 6 in Amerman also requires using the Mogensen teaching of installation "by turning such pipes in the spiraled direction" (last line of abstract), in which case what happens to the grout tube 160/166 of Amerman?

The spacers 6 of Mogensen are really being used as biasing members to bias the pipes 2 and 4 outwardly against the walls of the borehole.

Amerman's hole in the ground in Figs. 8A, 8B, 9A, has a diameter that is substantially greater than the distance between the left side of pipe152 and the right side of pipe 154. Amerman does his heat exchange with the grout that he puts in the hole with grouting pipe 41. Amerman does not seem to care about whether his pipes touch the walls of the borehole 43/167. Amerman is content to have heat exchange with the grout he installs into the borehole 167. Mogensen does not seem to be concerned about putting grout in his borehole. The undersigned did not see any reference to grout in Mogensen. It is almost as if Mogensen's spacer/helical pipe arrangement is being used in lieu of grout.

Mogensen's main concern is to push the pipes 2 and 4 against the borehole for facilitating the exchange of heat between the pipes 2 and 4 and the borehole, **not to keep the pipes 2 and 4 from touching one another or getting pipes 2 and 4 too close to one another**, as is a main concern in the instant invention. In Mogensen, if the diameter is small enough at some point it is theoretically possible that the pipes 2 and 4 could be in contact with the walls of the borehole and also in contact with each other. That is because the spacers 6 are flexible enough to allow the pipes 2 and 4 to be pushed against each other as they are:

"...decreasing or increasing the spacing of said pipes from said central axis to decrease or increase an overall radial dimension of the heat exchanger so as to contact the heat exchanging pipes with a defining surface of the drill hole." (Claim 6 of Mogensen, emphasis added.)

The instant claimed invention limits how close the hot and cold heat exchanger pipes can be too each other in the ground, something that Mogensen does not teach.

The combination of Amerman and Mogensen is improper and furthermore, when combined as proposed does not produce the claimed invention.

These two teachings (Amerman and Mogensen) just don't go together, except in hindsight to try to conjure up the claimed invention. These two references teach away from each other. Clearly there is no motivation to put the Mogensen spacers on Amerman as alleged in the Office Action "to better control the spacing and installation of the pipes as taught by Mogensen". Mogensen teaches:

"...decreasing or increasing the spacing of said pipes from said central axis to decrease or increase an overall radial dimension of the heat exchanger so as to contact the heat exchanging pipes with a defining surface of the drill hole."

The instant claims recite a "predetermined distance" between heat exchanger pipes. Mogensen certainly doesn't provide motivation to put this feature in the Amerman device.

Claims 6 and 10 have been rejected under 35 U.S.C. §103(a) as being unpatentable over Amerman in view of Mogensen as applied to claims 1-5, 7-9, 11 and 15-17 and further in view of Scholl alleging that it would have been obvious to use pipes that are connected together along their lengths by a continuous integral attachment, "...the motivation being to better control the spacing of the pipes."

This rejection is respectfully traversed.

First of all the combination of Amerman and Mogensen is improper for the reasons given above with respect to the rejection of claim 1. The proposed combination of Amerman and Mogensen does not produce the claimed invention.

Secondly, Amerman teaches:

"...decreasing or increasing the spacing of said pipes from said central axis to decrease or increase an overall radial dimension of the heat exchanger so as to contact the heat exchanging pipes with a defining surface of the drill hole."

In contrast, Scholl teaches keeping adjacent pipes parallel to each other, i.e. not decreasing or increasing the distance between adjacent pipes. Clearly it can't be both.

In Scholl, the web 3 between pipes 2 is for the purpose of equally spacing adjacent pipes

2 and allowing for modular installation of these heat exchanger pipes 2, instead of merely installing each pipe 2 individually. This purpose does not exist in Amerman et al., and would unduly increase the cost of the Amerman et al., pipes for no reason recognized by Amerman et al. There is no motivation to one of ordinary skill in the art at the time this invention was made to combine the references as proposed in the rejection.

In Scholl, all of the pipes 2 have fluid in them of substantially the same temperature. The pipes 2 all gather heat when used for heating. This heat is collected by bringing in colder liquid in header pipe 55 (col.4, line 23) directing the cold liquid through web connected pipes 2 to a discharge pipe 58 (Fig.18). The cold liquid goes in pipe 55, through all of the pipes 2 for heating and out pipe 58 to take the heated fluid to a place where the heat can be extracted and used. This is fundamentally different than what is happening in Amerman, et al. In Amerman, et al., the adjacent inlet and outlet pipes correspond to pipes 55 and 58 of Scholl, not adjacent web connected pipes 2 of Scholl. The teaching of Scholl, is to teach connecting a web between pipes of a heat exchanger which are all gathering heat or all giving up heat, not between two pipes containing a liquid of different temperatures like that of Amerman, et al. To provide this proposed teaching, there must be a web between pipes 55 and 58 of Scholl, not between adjacent pipes 2. There is no web between hot/cold pipes 55/58 of Scholl. All of the pipes 2 of Scholl connected together by webs are for liquid of the same temperature. The web between pipes 2 of Scholl is not for keeping heat from being exchanged by adjacent pipes as in the instant claimed invention. There is no problem in Scholl if heat is exchanged between adjacent pipes 2.

None of the three references used in this rejection recognize the problem that is solved by the instant invention, problem being the **undesirable exchange of heat between an underground inlet pipe and an adjacent underground outlet pipe.** This problem is solved by the instant invention by providing an **integral spacing web to keep the inlet and outlet pipe a predetermined distance** apart in the ground so that the heat is exchanged between the ground and the liquid in each respective pipe and not between the fluid in the inlet and outlet pipes themselves.

In summary, it would not be obvious to make the proposed modifications to Amerman, et al., because none of the secondary references recognize a reason to do so, i.e. to space the hot

and cold heat exchanger pipes in the ground a predetermined distance apart. The problem is that when the hot and cold pipes of an underground heat exchanger touch each other or become too close to each other, they exchange heat, instead of exchanging heat with the ground. Mogensen is trying to bias the pipes against the borehole, which is one way to solve the problem. The present invention solves the problem in another way, not by biasing the pipes against the borehole but by keeping them a predetermined distance apart.

Accordingly, since claims 1-11 and 15-17 are believed to be clearly allowable, a notice to that effect is earnestly solicited.

Respectfully submitted,

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